



U.S. Department
of Transportation
**Research and
Special Programs
Administration**

NOV 3 2000

400 Seventh St., S.W.
Washington, D.C. 20590

DOT-E 10914
(SIXTH REVISION)

EXPIRATION DATE: October 31, 2002

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: Honeywell International, Inc.
Morristown, New Jersey
2. PURPOSE AND LIMITATIONS:
 - a. This exemption authorizes the manufacture, mark, sale and use of a non-DOT specification cylinder conforming with all regulations applicable to a DOT specification 3HT cylinder, except as specified herein, for the transportation in commerce of the material authorized by this exemption. This exemption provides no relief from any Hazardous Materials Regulation (HMR) other than as specifically stated herein.
 - b. The safety analyses performed in development of this exemption only considered the hazards and risks associated with transportation in commerce.
3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.
4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR §§ 173.302(a) and 175.3 in that non-DOT specification cylinders are authorized.
5. BASIS: This exemption is based on the application of Honeywell International dated October 26, 2000, submitted in accordance with § 107.109.

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6. HAZARDOUS MATERIALS (49 CFR § 172.101):

Proper Shipping Name/ Hazardous Material Description	Hazard Class/ Division	Identi- fication Number	Packing Group
Helium, compressed	2.2	UN1046	N/A

7. SAFETY CONTROL MEASURES:

a. PACKAGING - Packaging prescribed is a spherical non-DOT specification welded pressure vessel, made of a titanium alloy. The vessel has a water capacity of 1385 cubic inches, nominal and a 10,000 psig maximum service pressure. The pressure vessel must conform with Garrett Fluid Systems Division (GFSD) Drawing 3253238, and technical specifications and calculations on file with the Office of Hazardous Materials Exemptions and Approvals (OHMEA). In addition, the pressure vessel must conform with DOT Specification 3HT cylinders (§§ 178.35 and 178.44) except as follows:

§178.44(a) *Type, size and service pressure.*

Welded spherical pressure vessel as shown in GFSD Drawing 3253238 having a nominal water capacity of 1385 cubic inches with a service pressure of 10,000 psig maximum.

§178.44(b) *Authorized material.*

Titanium alloy TI-6AL-4V conforming with AMS 4967.

§178.44(d) *Manufacture.*

By best appliances and methods; dirt and scale to be removed as necessary to afford proper inspection. Two machined half shells must be welded in accordance with AMS 2680 with one girth weld.

§178.44(e) *Welding or Brazing.*

Welding as prescribed in §178.44(d) of this exemption is authorized. All welds must be 100 percent radiographed and penetrant inspected after hydrostatic test.

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§178.44(f) *Wall thickness.*

(1) Minimum wall thickness must be such that the wall stress at minimum specified test pressure shall not exceed 75 percent of the minimum tensile strength of the material as determined from the physical tests prescribed in §178.44(m), and shall not be over 155,000 psi.

(2) Calculations must be made by the formula:

$$S = PD/4t$$

where:

S = Wall stress in pounds per square inch gauge;

P = Minimum test pressure in pounds per square inch gauge;

D = Inside diameter in inches; and

t = minimum wall thickness in inches.

§178.44(g) *Heat treatment.*

Each pressure vessel must be heat treated per MIL-H-81200 and GFSD Drawing PL3253238 to obtain the mechanical properties specified in §178.44(p) of this exemption.

§178.44(i) *Hydrostatic test.*

Applies except that test pressure is 17,250 psig, minimum.

§178.44(j) *Cycling tests.*

The cyclic pressurization test must be performed on at least three prototype pressure vessels.

(1) * * *

(2) Cyclic testing on a lot basis is not required.

(3) In this exemption, a "lot" is defined as a group of pressure vessels successively produced having the same:

(a) size and configuration;

(b) specified material of construction;

- (c) process of manufacture and heat treatment;
- (d) equipment of manufacture and heat treatment;
and
- (e) condition of time temperature and atmosphere
during heat treatment.

In no case may the lot size exceed 200 pressure vessels but any pressure vessel processed for use in the required destructive testing need not be counted as being one of the 200 cylinders.

(4) * * *

§178.44(l) *Flattening test.*

Not required

§178.44(m) *Physical tests.*

* * *

(1) Required on 2 specimens cut from one pressure vessel out of each lot or from a ring of the same thickness as the spherical pressure vessel subjected to the same heat treatment as the finished pressure vessel.

* * *

§178.44(n) *Magnetic particle inspection.*

Magnetic particle inspection is not required. Instead, each pressure vessel must be inspected using apparatus and procedures for liquid penetrant examination in accordance with MIL-STD-6866 with acceptance criteria in accordance with MIL-STD-1907. Inspection shall be performed externally on the finished pressure vessel after hydrostatic test. Evidence of discontinuities, which in the opinion of the qualified inspector may appreciably weaken or decrease the durability of the pressure vessel, shall be cause of rejection.

§178.44(p) *Acceptable results of tests.*

(1) Not applicable

(2) Physical tests: The following minimum mechanical properties must be met:

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- (i) Ultimate tensile strength = 155,000 psi;
- (ii) Yield strength = 145,000 psi;
- (iii) Elongation = 10% minimum;
- (iv) Reduction in area = 20% minimum

(3) Minimum burst pressure = 22,450 psig.

(4) Cycling: Test pressure vessels must withstand at least 5,000 pressurizations without evidence of distortion or failure.

\$178.44(q) Rejected pressure vessels.

(1) Reheat treatment is authorized; subsequent thereto, acceptable pressure vessels must pass all prescribed tests.

(2) Repair of welds is authorized after which reheat treatment is required and; subsequent thereto, acceptable pressure vessels must pass all prescribed tests.

\$178.44(r) Marking.

(1) Applies, except that:

(i) Instead of DOT-3HT, pressure vessels must be marked "DOT-E 10914" followed by the service pressure and in accordance with 178.35 (f).

(ii) Marking by low stress type method such as electrochemical etching, vibro-pen or laser marking, which does not decrease the integrity of the pressure vessel, is authorized.

(2) Stamping of elastic expansion is not required.

(3) Name plates are not required.

\$178.44(s) Inspectors Report.

The inspector's reports must be appropriately modified to reflect compliance with this exemption.

b. TESTING - Each pressure vessel may not be filled and shipped unless it has been reinspected and hydrostatically retested every 3 years in accordance with § 173.34(e) as

prescribed for DOT-3HT cylinders, except that the rejection elastic expansion criteria does not apply.

8. SPECIAL PROVISIONS:

a. In accordance with the provisions of Paragraph (b) of § 173.22a, persons may use the packaging authorized by this exemption for the transportation of the hazardous materials specified in paragraph 6, only in conformance with the terms of this exemption.

b. A person who is not a holder of this exemption, but receives a package covered by this exemption, may reoffer it for transportation provided no modifications or changes are made to the package and it is offered for transportation in conformance with this exemption and the HMR.

c. A current copy of this exemption must be maintained at each facility where the package is offered or reoffered for transportation.

d. Each packaging manufactured under the authority of this exemption must be marked with a registration symbol designated by the Office of Hazardous Materials Exemptions and Approvals for a specific manufacturing facility.

e. A current copy of this exemption must be maintained at each facility where the package is manufactured under this exemption. It must be made available to a DOT representative upon request.

f. Pressure vessels are subject to the use restrictions prescribed in § 173.302(a)(2), except that they may also be used in military weapons or defense initiatives systems. A copy of the inspector's report on the first lot in §178.44(s) must be submitted to the OHMEA prior to initial shipment.

g. Pressure vessels must be shipped in strong outside packagings in conformance with § 173.301(k).

h. The use of pressure vessels is not authorized 10 years after the date of manufacture or after 10 refills, whichever comes first.

9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle, rail freight, cargo vessel and cargo aircraft only.

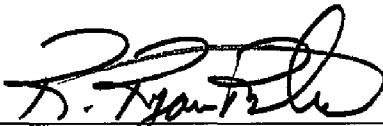
10. MODAL REQUIREMENTS: A current copy of this exemption must be carried aboard each cargo vessel and aircraft used to transport packages covered by this exemption. The shipper must furnish a copy of this exemption to the air carrier before or at the time the shipment is tendered.
11. COMPLIANCE: Failure by a person to comply with any of the following may result in suspension or revocation of this exemption and penalties prescribed by the Federal hazardous materials transportation law, 49 U.S.C. 5101 et seq:
- o All terms and conditions prescribed in this exemption and the Hazardous Materials Regulations, Parts 171-180.
 - o Registration required by § 107.601 et seq., when applicable.

Each "Hazmat employee", as defined in § 171.8, who performs a function subject to this exemption must receive training on the requirements and conditions of this exemption in addition to the training required by §§ 172.700 through 172.704.

No person may use or apply this exemption, including display of its number, when the exemption has expired or is otherwise no longer in effect.

12. REPORTING REQUIREMENTS: The carrier is required to report any incident involving loss of packaging contents or packaging failure to the Associate Administrator for Hazardous Materials Safety (AAHMS) as soon as practicable. (Sections 171.15 and 171.16 apply to any activity undertaken under the authority of this exemption.) In addition, the holder(s) of this exemption must also inform the AAHMS, in writing, as soon as practicable of any incidents involving the package and shipments made under this exemption.'

Issued in Washington, D.C.



RA Robert A. McGuire
Associate Administrator for
Hazardous Materials Safety

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Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Research and Special Programs Administration, Department of Transportation, Washington, D.C. 20590.
Attention: DHM-31.

The original of this exemption is on file at the above office. Photo reproductions and legible reductions of this exemption are permitted. Any alteration of this exemption is prohibited.

Copies of exemptions may be obtained from the AAHMS, U.S. Department of Transportation, 400 7th Street, S.W., Washington, DC 20590-0001, Attention: Records Center, 202-366-5046.

PO: KFW/AM